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CONTRACT LOGISTICS SUPPORT (CLS) IN THE TWENTY FIRST CENTURY: A COMPARATIVE ANALYSIS OF CLS IN THE T-45 PROGRAM USING NAMP/4790 PROCEDURES VICE COMMERCIAL BEST PRACTICES

by

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ABSTRACT

This thesis evaluates the current United States Navy (USN) Contract Logistics Support (CLS)arrangement on the T - 45TS program, and compares it to commercial best practices. The objective was accomplished by evaluating the existing system and using technical, functional, and operational analyses to determine the feasibility of improving USN practice in contract methodology and language for future CLS implementations in general and on the T - 45TS program in particular. Using archival research, interviews, and site visits, this study identifies the current system and state of the art commercial best practices in service contracts and contracting/quality control over sight applicable to USN CLS implementation. Broad findings include: competitively bidding a contract without owning the engineering data rights may be costly in the long run; and infusion of best commercial practices and international quality standards vice strict compliance with government practices provides an opportunity to decrease life cycle costs through reduced oversight and state of the art management techniques and processes. Further findings and recommendations on specifically improving the T - 45TS program are included in the areas of; Improving contract practices, Personnel Qualifications and Training.

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I. INTRODUCTION

A.   PURPOSE

The purpose of this research paper is to investigate and comment on the United

States Navy's (USN) experience in Contractor Logistics Support (CLS) on the T - 45

program using Naval Aviation Maintenance Program (NAMP) / 4790 Quality Assurance

(QA) Procedures. In particular, the Personnel Qualifications and training programs

mandated by the NAMP are compared to commercial practices. The research evaluates

the existing system and, through technical, functional, operational, and economical

analyses, determines the feasibility of improving USN contract methodology and

language for future CLS initiatives.

B.   BACKGROUND

The U.S. Navy is entering the twenty-first century with declining defense budgets

(GAO, Defense Sector: *Trends in Employment and Spending*, April 1997). The

challenge for the logistics professional will be to provide best value logistics to the Fleet

units, without inhibiting mission execution. This can be defined as minimizing life cycle

costs for Navy equipment and using the most effective management and technological

innovations available.

The T - 45 Training System (T45TS) is one of the first fully integrated training

systems funded by the U.S. Navy. It replaces the T - 2C and TA - 4J training systems. It

includes the Boeing built T - 45 Goshawk aircraft, advanced flight simulators, computer-assisted instructional programs, a computerized training integration system, and a contractor logistics support package. Integrating all five system elements produces a superior pilot in less time and at a lower cost than possible with previous training systems.

Contractor Logistics Support (CLS) in the T - 45 program is provided by the Boeing Corporation. CLS for this program includes planning, managing and performing all maintenance actions and procedures, supply activities, retrofit installations and inspections for engineering changes and inspections, technical publication changes and other related support activities for the entire training system, including aircraft simulators and academic subsystems. The CLS package covers all operational-level and depot-level maintenance, i.e., maintaining the entire training system.

Integrating Contractor Logistics Support (CLS), using best business practices, decreases life cycle costs through reduced oversight, state of the art management techniques and processes, reduced inventory and redundant engineering. These realized savings could be invested in Fleet modernization. Incorporating best commercial practices and international quality standards vice strict compliance with NAMP 4790 practices can provide a simplified and reduced management structure within the T - 45 Training System. Savings may be realized through a single point of accountability with reliability - based logistics, reduced spares acquisition time and inventory levels and lower administrative and oversight costs. More importantly, these changes will increase readiness and decrease total Life-Cycle Costs.

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C.   SCOPE OF THESIS

This research will evaluate Quality Assurance oversight, inspection, and manage and monitor programs for powerplants, avionics and airframes. Personnel qualifications and required training for these programs or areas is emphasized. Training and qualifications mandated by the 4790 will be compared to commercial practices, i.e., professional qualifications/licensing and job entry skills. Based upon this comparison, opportunities and recommendations for support program cost savings, and process and/or resource savings, will be identified.

D.   RESEARCH QUESTIONS

PRIMARY RESEARCH:

How can Commercial Best Practices (CBP) in aviation support be implemented in USN CLS?

1. What are the current NAMP Q/A practices?

2. What are the current CLS Q/A practices and how do they differ from the NAMP 4790 practices?

3. What commercial best practices are compatible with the T - 45 support program?

4. What are the major differences in aviation support - CLS vs. USN - and how do they work for changes in CLS contracts?

5. How do we implement CLS that de-emphasizes standard NAMP 4790 practices due to environment and personnel differences between contracted, civilian labor with their associated FAA maintenance practices and US Navy aviation active and reserve personnel?

6.   How do we competitively bid a CLS contract that assures quality without sacrificing current standards?

E.   METHODOLOGY

The methodology used in this thesis includes the following steps.

1.   Conduct a literature search of books, magazine articles, CD-ROM systems, and other library information resources.

2.   Survey the T - 45TS site at Kingsville, Texas and other commercial activities.

3.   Benchmark the 4790 system as currently conducted by:
     a.   Navy
     b.   Boeing

4.   Compare Navy QA programs to the commercial sector, i.e., commercial best practices.

5.   Evaluate selected other CLS programs currently administered by NAVAIR program offices for applicability to this study.

F.   THESIS ORGANIZATION

The introduction in Chapter I identifies the focus and purpose of the thesis, and states the primary and subsidiary research questions. Chapter II provides a background of the NAMP and its applicability to CLS in aviation. Additionally, it discusses the application of contractor self-oversight through strengthened contractor internal controls, i.e., ISO-9001 certification. Chapter III examines and compares the processes and management practices of the NAMP and commercial aviation as applicable to the T -

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45TS. Chapter IV presents a clear and concise summary of the conclusion and recommendations that are drawn form the research.

G.   BENEFITS OF STUDY

This study will benefit all Navy and DOD activities that are using or intend to use CLS by integrating commercial sources and introducing best practices. It will serve as a baseline for other Navy organizations seeking to implement CLS to improve or augment existing support plans.

II. METHODOLOGY/LITERATURE REVIEW

A.   INTRODUCTION

This chapter characterizes the industrial/cultural environment surrounding CLS in

the T-45TS program and acquisition reform in general. The chapter includes background

on DOD policies, regulations and guidance on acquisition reform issues concerning CLS

and outlines major topics related to this research. Additionally it explains the NAMP and

its applicability as an overarching architecture to the T-45 program.

B.   COMMISSION ON ROLES AND MISSIONS (CORM)

The CORM, published in 1995, was the first large scale study to emphasize that

significant cost savings could be made in DOD by outsourcing and/or privatizing

traditionally public functions. The DOD defines outsourcing as the transfer of functions

performed in-house to outside providers and privatization as the transfer or sale of

government assets to the private sector. The CORM's charter included identifying

opportunities to increase efficiency and save money. They did this by reviewing all

central support activities, i.e., logistics, headquarters, personnel, acquisition management,

training, medical, and installations and facilities. The study predicted potential savings of

approximately twenty percent by either outsourcing or privatizing and that private

industry could improve overall effectiveness of the DOD.

In addressing logistics and material management, the CORM recommended that all wholesale-level warehousing, distribution, weapons-system depot level maintenance and repair, property control and disposal, and incurred-cost auditing of DOD contracts be outsourced. [1, pES1]

The primary emphasis of the CORM was its insistence on relying on the private-sector for services that didn't need to be performed by the government and to reengineer the remaining government support organizations. The following are specific recommendations for the CORM regarding outsourcing:

1. Outsource all commercial - type support activities.

2. Outsource new support requirements.

3. Withdraw OMB Circular A-76; Repeal or amend congressional legislative restrictions; DOD should develop a policy over all commercial-type activities to avoid using public/private competition where adequate private - sector competition exists;

4. Move DOD to a depot maintenance system which relies on the private sector;

5. Direct support of all new systems to competitive private contractors;

6. Establish a time - phased plan to privatize essentially all existing depot-level maintenance;

7. Create an office under the Assistant Secretary of Defense (Economic Security) to oversee depots privatization. [1, p3-3 - 3-8]

While the CORM ardently argues to outsource essentially all material management functions, they acknowledge the value of highly - skilled work forces and heavily - capitalized depot facilities. They suggested that these assets would make depots prime candidates for privatization-in-place.

The CORM does concede that although there are tremendous savings available through outsourcing many commercial activities, not all government activities lend themselves to outsourcing. The conditions for favorable outsourcing may not always be present and the Government must retain certain core functions to best serve the public interest. [1, p3-3] However, the CORM concludes their recommendations by stating that DOD should rely on the private-sector for all new support activities.

C.   DEFENSE SCIENCE BOARD (DSB) ON OUTSOURCING AND PRIVATIZATION

The DSB report was released in 1996.[2] The DSB task force on outsourcing and privatization was chartered to develop recommendations on ways outsourcing as an could free up substantial funds to support DOD defense modernization needs. The DSB task force was convinced that an aggressive DOD outsourcing initiative would improve the quality of support services at significantly reduced costs. The task force recommended that the Secretary of Defense (SECDEF) plan to generate between seven and twelve billion dollars in outsourcing-related savings by the year 2002 to expand DOD of investment programs. The task force believed that all DOD support functions should be contracted out to prime vendors, except those inherently governmental functions which are directly involved in war fighting, or where no adequate private - sector capability exists or can be expected to be established. In order to achieve these benefits, the DSB task force recognizes that three major changes must take place:

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1. Changes in Defense policies and procedures to facilities outsourcing,

2. Relief from legislative impediments and regulatory constraints,

3. Improvements in Defense contracting procedures and incentives to encourage greater reliance on outsourcing.[3, p2]

The task force indicated that most defense agencies are prime candidates for outsourcing. The task force specifically recommended that DOD consider outsourcing major portions of the Defense Commissary Agency (DCA), the Defense Information Systems Agency (DISA), and the Defense Finance and Accounting Service (DFAS) and to initiate steps toward streamlining defense infrastructure.

Much of the DSB's information was developed by extrapolating outsourcing data from the private and public - sector. They cited studies indicating that outsourcing is expanding rapidly to provide a wide range of services. The report also indicated that in addition to cost savings, other benefits are reaped through outsourcing. These include access to better technology and better qualified people. Many companies turn to outsourcing to allow management to focus more of their time and energy on the business's core competencies. The public - sector has also confirmed the value of outsourcing. Many Federal, State, and local Government functions have been outsourced, generating over thirty percent savings and providing better, more responsive support.

The task force captured many lessons learned from the private-sectors' experiences while transitioning to outsourcing services. These critical ingredients for a successful outsourcing venture focus on management issues.

1. Senior executive leadership: The commitment to make this work must be top-driven.

2. Outsource broad processes: This permits the streamlining of contract management and oversight functions. It also encourages greater synergy of outsourced activities.

3. View benefits from life-cycle: The true benefits of outsourcing may take time to fully manifest themselves. Disagreements regarding scope or vendor strategies are common during the early stages of outsourcing.

4. Small, highly trained oversight cadre: The savings and flexibility provided by outsourcing could be lost if the client firm imposes a large and bureaucratic oversight structure.

5. Partnership: Foster an environment of collaborative problem- solving rather than an adversarial or us-versus-them relationship. "Outsourcer must establish a true partnership with the vendor and approach problem-solving as a team."[3, p 22A]

The task force viewed outsourcing as a practical means to free up the critical resources necessary to modernize U.S. forces, not as an end to itself. In conclusion, the DSB task force stated that, "as a matter of principle as well as for reasons of sound policy, all DOD support activities that are commercial in nature should be provided by private vendors." [2, p3-8] In addition, they stated that the Government should not compete for business with its own citizens. The private - sector is the primary source of creativity, innovation, and efficiency, and is more likely to provide cost-effective support to the Military Forces. The following lists key elements of an aggressive outsourcing strategy as proposed by the Task Force:

1. Establish a presumption of outsourcing;

2. Outsource broad support functions;

3. Eliminate statutory and institutional impediments;

4.   Establish our implementation plan with aggressive targets and milestones - hold senior managers accountable.[3, p 50A]

The effect of the DSB's final recommendations is the emphasis on utilizing the private sector for outsourcing and privatization of any function that could be considered commercial in nature. The T - 45 program's support, and that of any other CLS program falls into this category. Privatization or commercialization of pilot training is a very real possibility for the future of the T - 45 program.

D.   PERFORMANCE-BASED SERVICE CONTRACTING (PBSC)

PBSC emphasizes structuring all aspects of an acquisition be structured around the purpose of the work to be performed as opposed to either the manner in which the work is to be performed or through broad, imprecise statements of work which preclude an objective assessment of contractor performance. PBSC is designed to ensure that contractors be given the freedom to determine how to meet the government's performance objectives, and that payment is only made for services which meet appropriate performance quality levels.

PBSC was successfully pioneered within the Department of Defense. However, this proven methodology has yet to be fully implemented for a variety of reason, including inexperience in writing performance-based statements of work, cultural inertia, and a resistance to more open and interactive communication with industry throughout the acquisition process. PBSC also makes it harder for agencies to redirect the contractor after award or use contractors for personal services. [4, p 2]

To promote this policy, the Office of Federal Procurement Policy (OFPP), initiated a pledge pilot project to encourage the government to use PBSC. Twenty-six agencies initially pledged to convert eighty-six contracts with an estimated value of $1.2 billion to performance-based methods. Services covered by these contracts range from janitorial and guard services to computer maintenance and systems engineering.[4, p3]

OFPP issued Policy Letter 91-2, defines PBSC and its application. It requires using of PBSC methods where practical, and requires agencies to better match their acquisition and contract administration strategies to the specific requirements. Essentially, PBSC requires structuring the acquisition around "what" is required as opposed to "how" the contractor should do the work. PBSC is based on developing a performance work statement which defines the work in measurable, mission-related terms. Performance standards (i.e., quantity, quality, timeliness) are assigned to the performance requirements, and a Government quality assurance (QA) plan describes how the contractor's performance will be assessed against the standards. Positive and negative incentives, based on the QA measurements, are assigned to stimulate desired performance.

PBSC complements the Government's overall approach to managing for results, not to process. Under PBSC, the Government pays for results, not effort or process, and contractors are free to determine the best and most cost effective ways to fulfill the Government's needs. PBSC also reduces unnecessary contract administration costs by moving agencies away from audit-oriented, cost reimbursement and level-of-effort contracts to fixed price completion contracts. PBSC requires formally developed

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contract administration plans which define the most cost effective use of Government resources to measure contractor performance. Contractors obtain a clearer understanding of the Government's expectations, and disputes and inherent learning curve waste are reduced.

Some contracting activities, most notably the Department of Defense, have used PBSC for over 20 years, and anecdotally have reported positive results. Despite their experiences and the compelling logic of PBSC, implementation has not been fully pursued. There are many possible reasons for this, including: downsized procurement and programs staffs trying to incorporate many contract reform initiatives in a relatively short time frame; bureaucratic inertia; resistance to change; fear of giving up day to-day control over contractor work processes; and concern over a perceived loss of flexibility in directing contractors.[4, p 4]

OFPP launched a pilot program in 1994 in conjunction with the Federal Acquisition Streamlining Act. The purpose of this project was to test PBSC and its possible cost-savings.

Preliminary project results from the participating agencies indicated 15-20% savings and anecdotally reported increased satisfaction with contractor performance. These results were deemed sufficiently promising. As a result, 20 agencies submitted plans to convert more than 1,000 contracts valued at over $20 billion to PBSC over the next few years.[5, p5]

PBSC emphasizes what the government wants performed by the contractor, in mission - related terms, versus how the work should be performed, or using broad and

general work scopes The Navy demonstrated its leadership role in acquisition reform by participating in a pilot project to determine the benefits of PBSC. The results of this pilot program and its comparison to the T - 45 program will be discussed in Chapter III.

E.   NAVAL AVIATION MAINTENANCE PROGRAM (NAMP)

All aircraft maintenance, either by commercial companies or military personnel, performed in the U.S. Navy is done under the policies and procedures prescribed in the NAMP, this includes the T-45 program. The NAMP and its mandated oversight is highly effective in the military environment under which it evolved, but can be restrictive if used for aircraft not required to be maintained by Navy personnel in a non - hostile environment.

The NAMP provides an integrated system for performing aeronautical equipment maintenance and related support functions. It was established by the Chief of Naval Operations (CNO) and implemented by the Chief, Bureau of Aeronautics, on 26 October 1959. Because of the dynamic nature of the program, the NAMP has been periodically revised to incorporate improved methods and techniques, such as the three levels of maintenance concept. The naval aviation Maintenance and Material Management (3M) system was introduced on 1 January 1965, as part of NAMP to collect maintenance data and man-hour and aircraft accounting.[7]

In January 1968, the CNO noted that the major implementing directives of the NAMP needed revision, updating and issuance as a cohesive, command-oriented publication. CNO directed consolidating all implementing directives into a single family

of documents. The result was the four volume OPNAVINST 4790.2, issued in July 1970, which included a maintenance data collection subsystem.[7]

In June 1972, a major revision was issued as OPNAVINST 4790.2A. In 1977, the NAMP Policy Committee recommended a fundamental change in the overall format to make the instruction more useful at the maintenance management level. In July 1979, a major revision was issued as OPNAVINST 4790.2B. In October 1984, a major revision was issued as OPNAVINST 4790.2C. This revision changed the chapter and paragraph numbering system to facilitate using the instruction. In October 1986, OPNAVINST 4790.2D, the fourth major revision was issued. In January 1988, OPNAVINST4790.2E added a sixth volume dedicated to maintenance data collection under both the aviation 3M system and the Naval Aviation Logistics Command Management Information System (NALCOMIS). In June 1995, OPNAVINST 4790.2F was issued on CD-ROM, with a limited paper version. It was the first version of the NAMP issued in interactive electronic format and reduced the NAMP to four volumes. The current revision, primarily available on CD-ROM, adds a new Volume V containing NAMP Standard Operating Procedures (NAMSOPs) and establishes the Computerized Self Evaluation Checklist (CSES) as the method of accomplishing NAMP audits.[7]

The NAMP is founded upon a "three-level" maintenance concept and is the authority governing the management of all three level. These levels are the Organization level, the Intermediate level, and the Depot level of aviation maintenance.

Organizational level (O-level) maintenance is performed by an operating unit on a day-to-day basis in support of its own operations. The maintenance mission is to

maintain assigned aircraft and aeronautical equipment in a full mission capable status while continually improving the local maintenance process. While Intermediate level or Depot level activities may perform O-level maintenance, it is usually accomplished by squadron maintenance personnel.

O-level maintenance functions generally can be grouped as :

1. Inspections;

2. Servicing;

3. Handling;

4. On-equipment corrective and preventive maintenance, including on-equipment repair, removal, and replacement of defective components;

5. Incorporation of Technical Directives within prescribed limitations; and

6. record keeping and reports preparation.

Intermediate level (I-level) maintenance is the responsibility of, and performed by, designated maintenance activities in support of user organizations. The I-level maintenance mission is to enhance and sustain the combat readiness and mission capability of supported activities by providing quality and timely material support at the nearest location with the lowest practical resource expenditure. I-level maintenance consists of both on and off equipment material support and may be grouped as follows:

1. Maintenance on aeronautical components and related support equipment;

2. Calibration of designated equipment;

3. Processing aircraft components from stricken aircraft;

4. Providing technical assistance to supported units;

5. Incorporating technical directives;

6. Manufacturing selected aeronautical components, liquids, and gases; and

7. Performing on-aircraft maintenance when required.

Depot level (D-level) maintenance is performed at naval aviation industrial establishments to ensure continued flying integrity of airframes and flight systems during subsequent operational service periods. D-level maintenance is also performed on material requiring major overhaul or rebuilding of parts, assemblies, subassemblies, and end items. It includes manufacturing parts, modifying, testing, inspecting, sampling, and aircraft reclamation. D-level maintenance supports O-level and I-level of maintenance by providing engineering assistance and performing maintenance beyond their capabilities. D-level maintenance functions may be grouped as follows:

1. Standard Depot Level Maintenance (SDLM) of aircraft;

2. Rework, repair and modification of engines, components, and support equipment;

3. Calibration of instruments and other equipment by Navy calibration laboratories;

4. Incorporation of technical directives;

5. Manufacture or modification of parts or kits; and

6. Technical and engineering assistance by field teams.

The overriding objective of the NAMP is to meet and exceed aviation readiness and safety standards established by the CNO. This is accomplished by optimizing the use of manpower, material, facilities and financial resources in accordance with policy guidance and technical direction provided by this instruction and by related implementing

directives. The methodology for meeting the objective is "continuous process improvement". The NAMP provides for the maintenance, manufacture and calibration of aeronautical equipment and material at the level of maintenance which will ensure optimum use of resources. It further provides for the protection of weapon systems from corrosive elements through an active corrosion control program, and the application of a systematic planned maintenance program. Finally, it provides for the collection, analysis, and use of pertinent data to continuously improve material readiness and safety at the least possible cost. [7]

The NAMP provides the management tools required for efficient and economical use of personnel and material resources in performing maintenance at any of the three levels. It also provides the basis for establishing standard organizations, procedures, and responsibilities for the accomplishment of all maintenance on naval aircraft, associated material, and equipment.

The division of maintenance into three levels allows management to:

1.   Classify maintenance functions by levels;

2.   Assign responsibility for maintenance functions to a specific level;

3.   Assign maintenance tasks consistent with the complexity, depth, scope, and range of work to be performed;

4.   Accomplish any particular maintenance task or support service at a level that ensures optimum economic use of resources; and

5.   Collect, analyze, and use date to assist all level of NAMP management.

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The prescribed use of the NAMP as a overarching directive vice a guide is restricting the current contractor and any future contractors from seeking out alternative (FAA commercial), standards that would fit into the category of commercial best practices. This is applicable to the T-45 program as well as any other aviation CLS program.

F.   COMMERCIAL BEST PRACTICES

Best practices describe the optimum ways to perform a business process. They are the means by which leading organizations have achieved top performance. They also serve as goals for other organizations striving for excellence.

Although the term "best practice," is used it is understood that, many times, there is no "best" way to do something. Every organization has unique goals, opportunities, and obstacles. Best practices must be evaluated in the context of a company's business strategy, its position on the technology curve, on the growth curve, and finally, the importance of the particular business process to the overall corporate goals. Therefore, best practices function more as a source of creative insight, rather than the one irrefutable answer to a business problem. This insight begins with the question, "Does this practice make sense for my organization?"

Since the identifying of a Best Practice is somewhat subjective, it must meet current industry standards. The following KPMG-Peat Marwick Best Practices Guidelines are used to test the validity of all Best Practices submissions.

A practice, method, or process may be deemed as a Best Practice:

1. When it produces superior results. Superior is defined as 25% or higher results than normal output.

2. When it is clearly a new or innovative use of manpower or technology.

3. When it is recognized by at least three different references as a Best Practice (that is, three or more public domain sources have referenced this practice).

4. When it has received an external award for this practice.

5. When it is deemed so by the organization's customers or suppliers.

6. When it is recognized by an industry expert.

7. When the organization(s) utilizing it have a patent for the practice, or

8. When it leads to exceptional performance. [8]

In concept, the search for best practices is a type of benchmarking. Benchmarking is a continuous process of comparing your operations to the best companies' performance. These comparisons are both quantitative and qualitative. Quantitative benchmarking uses metrics to compare quantitative performance results against world-class targets of cost, quality, and time. Qualitative benchmarking seeks to compare current operation practices and results if required to the practices employed by leading companies.

Understanding the insights that can come from a world-class organization outside your industry requires a different point of view-called a "process" view. What is "sales" to one company may be "marketing" or even "customer service" to another. A process view reveals the similarities that lie within apparently dissimilar organizations.

Key to understanding what commercial best practices are and what is available is the mindset that allows the organization to adapt and change to find the best for that

entity. In the T-45 program, and other CLS supported programs, the impositions of government directives and in some cases the required modeling after government organizations doesn't allow for the introduction of commercial best practices and the "value - added " that they can bring.

One of the most far reaching best practices is the evolution of companies from an inspection oriented quality assurance process, and the culture and infrastructure to support it , to a standard in which quality is an integral part of the design and production process or service provided.

G. CONTRACT OVERSIGHT/QUALITY ASSURANCE/ISO 9000 (ANSI/ASQC Q90) SERIES

Based on studies performed for the DOD, it is estimated that it spends more than $1.5 billion annually beyond what is necessary to support its quality assurance approach. [9, p 4] Despite this outlay, it has had long standing problems with significant cost and schedule over runs on its weapons system programs. Non - value added costs have increased in part because DOD has taken a narrow approach to implementing its quality standard.[9, p 3]

Based on information from studies performed for the Secretary of Defense,[9, p 4] contractors costs to implement DOD regulations and comply with DOD requirements equaled about $ 1 billion dollars. Most of this cost occurred as the result of contractor quality assurance and operations personnel devoting time to such things as preparing quality plans and procedures, conducting and documenting inspections, documenting

deviations, proposing corrections to government concerns, and supporting government audits and reviews. Additionally, DOD's own costs for costs for quality assurance oversight were about $687 million annually.

On the other hand, a number of successful commercial manufacturers and service providers have adopted a dramatically different approach. Driven by today's highly competitive markets, they have significantly improved quality in their products, while reducing oversight and inspection costs. The striking difference between the way DOD's weapon system programs and world-class companies practice quality assurance is that the latter defines quality assurances much more broadly, making it an integral part of the entire process from development through production to delivery.[9, p 3]

In the past several years, DOD has developed policies and procedures that reflect a broader approach to quality assurance. They are based on teaming/partnering with the contractor to control processes while reducing reliance on inspection and government oversight. To achieve the same results as world class companies will require DOD to consider quality assurance as an integral part of the entire acquisition process and diffuse responsibilities accordingly.

Budget cuts and force reductions in both the Defense Contract Audit Agency (DCAA) and Defense Contract Management Command (DCMC) are accelerating DOD's reliance on commercial based quality standards. DCAA provides accounting and financial advisory services in connection with negotiating, administering and closing out contracts. DCMC is DOD's principal oversight agency, providing assistance ranging from evaluation of contractors' proposals to on - site monitoring of contractors day - to - day operations.

From fiscal year 1993 to July 1997, DCAA and DCMC reduced their personnel levels by more than 18 and 24 percent, respectively, and further reductions are planned. In making these reductions, both organizations are reengineering their processes. They are attempting to rely on competitive market forces and contractor internal processes and controls to assure quality products and services.[10, p 2] Key to commercial companies reducing costs and gaining a competitive advantage over their competition has been the establishment of a quality system such as ISO - 9000.

The International Organization for Standardization (ISO) is the specialized international agency for standardization at present comprising the national standards bodies of 91 countries. The American National Standards Institute (ANSI) is the member body representing the United States. ISO is made up of approximately 180 Technical Committees. Each Technical Committee is responsible for one of many areas of specialization ranging from asbestos to zinc. The object of ISO is to promote the development of standardization and related world activities with a view to facilitating international exchange of goods and services and to developing cooperation in the sphere of intellectual, scientific, technological, and economic activity. The results of ISO technical work are published as international standards. The standards discussed here are a result of this process.[12]

ISO Technical Committee 176 (ISO/TC176) was formed in 1979 to harmonize the increasing international activity in the area of quality management and quality assurance standards. Subcommittee 1 was established to agree on common terminology. It developed ISO 8402: Quality-Vocabulary, which was published in 1986. ASQC published

ANSI/ASQC A3-1987: Quality Systems Terminology. While this document is not an adoption of ISO 8402, it does contain many of the exact terms and definition contained in ISO 8402. Also during this period, Subcommittee 2 was established to develop quality systems standards - the end result being the ISO 9000 Series, which was published in 1987.[12, p 2]

The United States had input into this development process through membership in ISO via ANSI. This input was channeled through a Technical Advisory Group (TAG). ASQC administers, on behalf of ANSI, the U.S. TAG to ISO/TC176. Qualified United States experts participate in the meeting and working groups where these documents are drafted. ASOC continues to administer the U.S. TAG to ISO/TC176, and the United States continues to contribute to this process of developing international standards on quality assurance and quality management and the generic supporting technologies necessary for full implementation.

The ISO 9000 Series is a set of five individual, but related, international standards on quality management and quality assurance. They are generic, not specific to any particular products. Each standard addresses a different aspect of quality assurance, depending on the needs of the user. They can be used by manufacturing and service industries alike. These standards were developed with the goal of effectively documenting the quality system elements to be implemented in order to maintain an efficient quality system in an organization. The ISO 9000 Series standards do not themselves specify the technology to be used for implementing the quality system elements.

ISO 9001, 9002 and 9003 describe three distinct quality system models of varying stringency for use in different applications. Common elements in ISO 9001, 9002, and 9003 include the need for:

1. An effective quality system;

2. Valid measurements, and calibrated measuring and testing equipment;

3. Appropriate statistical techniques;

4. A product identification and traceability system;

5. An adequate record keeping system;

6. An adequate product handling, storage, packaging and delivery system;

7. An adequate inspection and testing system as well as a process for dealing with nonconforming items; and

8. Adequate personnel training and experience. [13, p 4]

ISO 9000 (ANSI/ASQC Q 90), <u>Quality Management and Quality Assurance Standards - Guidelines for Selection and Use</u>, explains fundamental quality concepts; defines key terms; and provides guidance on selecting, using, and (if necessary) tailoring ISO 9001, 9002, and 9003.

ISO 9001 (ANSI/ASQC Q 91), <u>Quality Systems - Model for Quality Assurance in Design/Development, Production, Installation and Servicing,</u> is the most comprehensive standard in the series. ISO 9001 covers all elements listed in ISO 9002 and 9003. In addition, it addresses design, development, and servicing capabilities.

ISO 9002 (ANSI/ASQC Q 92), Quality Systems - Model for Quality Assurance in Production and Installation, addresses the prevention, detection, and correcting problems during production and installation. It is more extensive and sophisticated than ISO 9003.

ISO 9003 (ANSI/ASQC Q 93), Quality Systems - Model for Quality Assurance in Final Inspection and Test, is the least comprehensive standard. It addresses requirements for detecting and controlling problems during final inspection and testing.

ISO 9004 (ANSI/ASQC Q 94), Quality Management and Quality System Elements - Guideline, provides guidance for a supplier to develop and implement a quality system and to determine the extent to which each quality element is applicable. ISO 9004 examines each of the quality system elements (cross-referenced in the other ISO 9000 standards) in greater details and can be used for internal and external auditing purposes.[13, p4]

The use of these advanced quality assurance concepts and guidelines in the T - 45 program and in other CLS projects has the potential for significant savings. DOD faces a formidable challenge in changing its quality assurance culture but the requirement and need are here.

H.   CHAPTER SUMMARY

There are many significant efforts at work to improve the inner workings of DOD. Key among these are the efforts to reform the acquisition process and encourage DOD to

use commercial and industry processes and standards where applicable. Performance based contracting, application of Best Practices, and utilization of ISO programs are examples of these.

DOD is attempting to change its approach to quality by including commercial best practices. The T - 45 program with its NAMP system were developed and produced using inspection - oriented quality assurance practices and significant DOD oversight.

The overriding issue is the need to team with contractors to identify, analyze, and manage the production and maintenance processes with the goal to reduce the need for oversight and inspection where it makes sense. Effective use of commercial quality control systems and the reduction in governmental oversight is seen as the most beneficial and cost saving measures in contract logistics support.

III PROCESS COMPARISON/DISCUSSION OF THE T-45TS

A.   INTRODUCTION

This chapter provides the reader with background on the current T - 45TS

program, and compares this program to processes and practices currently used both by

the commercial sector and DOD activities to improve contractor performance and gain

best value. The reader will be provided with the results of a site visit to NAS Kingsville

Texas. Then a comparison to a similar aircraft CLS program using PBSC is given. The

site visit to United Air lines provides insight into both commercial contracting and state

of the art quality practices in use by one of the premier maintenance facilities in the

world. Finally, a USAF initiative in contract streamlining and commercial involvement in

pre - solicitation is presented with the savings gained by using this commercial best

practice.

B.   T - 45 TRAINING SYSTEM (T - 45TS)

The T - 45 Training System (T - 45TS) is the first totally integrated training

system developed for and used by the U.S. Department of the Navy. It includes the

Boeing-built T - 45A Goshawk, advanced flight simulators, computer-assisted

instructional program, a computerized training integration system, and a contractor

logistics support package. Integrating all five system elements produces a superior pilot in

less time and for a lower cost than previous training systems.

The two-seat, single-engine T - 45A Goshawk is at the heart of the T45TS. It has a wingspan of 30.10 feet, a length of 39.3 feet, a tail height of 13.5 feet and a takeoff gross weight of 13,636 pounds. The U.S. Navy's T - 45A Goshawk is powered by a Rolls-Royce Adour Mk 871 engine, producing 5,845 pounds of thrust. The T - 45A, which had its first flight on 1 April 1988, is fully operational at Naval Air Station (NAS) Kingsville, Texas; starting October 1997 it replaced the remaining T-2C Buckeyes and TA-4J Skyhawks at NAS Meridian, Mississippi.

Designed to excel in the rigorous naval aviation training environment, the Goshawk is being tested to a 14,4000-hour fatigue life. The current testing has more than 24,000 hours on the way to a full test of 28,800 spectrum hours. For aircraft carrier operations, the Goshawk also has strengthened landing gear, an arresting hook and catapult launch fittings.[14, p 1]

The T - 45A Goshawk can be modified and upgraded in additional ways to meet customers' needs and the changing demands of flight training. The most significant modification to date is a new digital cockpit, known as Cockpit 21. The digital cockpit will replace the analog cockpit and enhance the Navy's ability to train pilots for the F/A-18 Hornet, the AV-8B Harrier and other sophisticated carrier-based aircraft. With training in Cockpit 21, pilots transitioning to carrier-based jets can concentrate on learning key tactical maneuvers.

Cockpit 21 uses a 1553 bus and has two multi-function displays in each cockpit. The displays provide navigation, weapons delivery, aircraft performance and communications data. Cockpit 21 also has a global positioning inertial navigation

assembly and a heads-up display in the forward cockpit that provides high-brightness navigation, weapon aiming and status information. Cockpit 21 has a growth capacity in spare memory and throughput.[14, p 2]

The first production aircraft to be equipped with Cockpit 21 was aircraft No. 84. Aircraft No. 84 was delivered to Patuxent River Maryland, for testing in October 1997. The current T - 45A fleet is being retrofitted with Cockpit 21 at NAS Kingsville.

Along with the T - 45A aircraft, the total training system includes two types of flight simulators: an instrument flight trainer and an operational fighter trainer. The instrument trainer familiarizes student pilots with the T - 45A cockpit and flight instrumentation. The operational flight trainer has a visual system that presents a computer-generated view of the world outside the cockpit. The simulator is programmed for a wide variety of training maneuvers, including carrier approaches, formation flight, weapons delivery and a variety of weather scenarios.

Both simulators are equipped with G - suit/G - seat motion cueing to give trainees a feel for the G - forces they will experience during flight. The simulators are designed to fulfill a wide variety of instructional tasks, to ensure more productive use of time in the aircraft itself and to reduce overall training costs.

The T - 45TS also incorporates computer-aided instruction to supplement classroom lectures, which are delivered in a state - of - the - art electronic classroom. The training integration system (TIS) networks all elements of the T - 45TS to assist in scheduling of students in classroom, simulators and flight events; to monitor the progress

of students; to generate required reports for the command level; and to track equipment status.[14, p 3]

As the prime contractor for the T - 45TS, Boeing is responsible for developing and integrating the total T - 45TS. In addition, the company produces the T - 45A forward fuselage and horizontal stabilators, performs final assembly and production flight test operations, and provides maintenance for all system elements and integrated logistic support plans. British Aerospace produces the center and aft fuselage and wings; Hughes Training Inc. is the principal subcontractor for the simulators.

Goshawk production is planned well into the next century. Navy procurement plans for the T - 45TS call for 187 Goshawks, 19 flight simulators, six electronic classrooms, 48 computer-aided student work stations, one TIS networked to three sites, and 155 computer terminals. Production deliveries began in 1992, with deliveries occurring at a rate of roughly one aircraft per month. The aircraft have been flying at NAS Kingsville, and are currently exceeding expectations for availability. With current demand, the U.S. Navy has been averaging over 90 hours per month per airframe, 1080 hours per year. The original goal was 720 flight hours per airframe per year.

Undergraduate training in the T - 45TS began at NAS Meridian in July 1998, eight months after the first Cockpit 21-equipped T - 45C aircraft arrived in November 1997. Training for NAS Meridian instructors began at NAS Kingsville in August 1997, and shifted to the NAS Meridian facility on 1 December 1997.

Boeing currently plans to produce T - 45As through the year 2003; the U. S. Navy plans to keep them in service through at least the year 2020. This extended production

and operational period ensures that spare parts and technical expertise will be available to service and update the T - 45A.

To ensure the required availability of the T - 45A Goshawk and the T - 45TS's group-based training systems, Boeing as the Original Equipment Manufacturer (OEM) and Prime contractor, was selected to provide Contractor Logistics Support (CLS). CLS includes planning, managing and performing all maintenance actions and procedures, supply support activities, retrofit installations of engineering changes and inspections, technical publication changes and other related support activities for the entire training system, including aircraft simulators, TIS and academic subsystems.

The CLS package covers all operational-level, intermediate-level and depot-level maintenance - the maintenance of the entire training system. A training support center, like the one established for the U.S. Navy at Naval Air Station Kingsville, Texas supports the T - 45TS's ground-based training elements, which are often spread out between several operational sites. The staff at a training support center is responsible for revising and maintaining T - 45TS curricula and training materials, TIS software, and academic subsystem software and courseware.

The current and planned competitively bid contract requires that the contractor complete all aircraft servicing, inspection, repair, and overhaul maintenance and support in accordance with Navy accepted schedules and procedures, as proscribed in the NAMP and in over ten pages of applicable instructions. The planned contract is for one year, with a turnover clause and requirement if the incumbent doesn't win the follow - on bid.

This contract was previously a sole source award to Boeing , the OEM. This isn't unusual; between FY 1996 and March 1997, the Navy used non competitive contracts for depot repair and maintenance 99 percent of the time, involving 72 percent of the total dollar value awarded.[10, p 5]

In awarding Boeing the sole source T - 45TS program, as is the case for many other weapon systems and components, the Navy failed to acquire the technical data. This money savings initiative may make future competitive bidding difficult; buying the data rights at this point would be prohibitively expensive. Officials at the contracting organizations believe that the technical data must be bought as a part of the initial acquisition package or the government has little leverage to get the data at an affordable price later in the system life cycle.

The government's role in this program includes, but isn't limited to:

1.   Monitoring contractor performance;

2.   Managing the Naval Air Training and Operating Procedures

        Standardization (NATOPS) flight manuals.

3.   Providing space and utilities.

4.   Participating interactively in Safety and Maintenance programs.

Additionally the Government reserves the right to verify the contractors maintenance actions. Government Furnished Equipment (GFE), facilities, and utilities are provided on a no-cost basis. Shared equipment located in the facilities annexes will be maintained, repaired or replaced by the Government. The Chief of Naval Air Training (CNATRA) and Naval Air Training Management Support Activity (NATMSACT)

monitor and evaluate maintenance data, review both contractor maintenance reports and Quality Assurance and Revalidation (QA&R) reports, conduct unscheduled periodic inspections and audits, and observe cleanliness and general maintenance practices. The NATMSACT Detachment provides onsite oversight by monitoring and evaluating maintenance data, reviewing both contractor maintenance reports and QA&R reports, conducting unscheduled periodic inspections and audits, and observing trainer cleanliness and general maintenance practices.

C.   T - 45TS SITE VISIT, NAS KINGSVILLE TEXAS

As stated above, NAS Kingsville was the initial site for introducing the T - 45TS program; as such, it is the model for this program. As of August 1998, there were 76 aircraft at Kingsville, Texas and 8 at Meridian, Mississippi. Meridian is scheduled to have approximately 70 aircraft onboard, and will be receiving them at the rate of about one and a half per month over the next 18 months.

Currently, Kingsville is reducing its personnel by approximately 50 employees. This reduction is in accordance with planned reductions under the current contract due to a change in pilot training rates (PTR). As such, the contractor has been able to meet and/or exceed his current contract goals with 100 percent plus aircraft availability. Key to the success of this site is the above average experience level of the contractor's personnel. The average experience level of this contractor's personnel is 16+ years of aircraft experience, with a high percentage of the leadership being retired military with aviation background. Additionally, there is an extremely low turnover rate and many of the

personnel have been in this program since its inception. This experience level compares favorably with the average Navy squadron's level of approx. 3 - 7 years of experience and a turnover rate of 30+ percent annually.

NAS Kingsville is the site of the expanded "I" level of maintenance (Integrated Maintenance Improvement Program - IMIP) and the MOD line with its inherent on - site engineering support. The expanded I level of maintenance is, in all but name, a complete overhaul/SDLM process. This capability, IMIP, will stay at Kingsville for both itself and NAS Meridian.

Additionally, they will be expanding engine repair capability in 1999; they currently repair modules 3 and 5. In October 1999, they will add the capability to repair modules1 - 4 - 6 - 8. The engines are currently being sent to either Canada or England for these repairs and balancing. Expected savings are in excess of $200 million over the program's life[15, 16]. It is readily apparent that the T45 program and contractor are trying to get better upstream control of their logistics costs by bringing them in - house or closer geographically. This will reduce both pipe line inventory costs and transportation costs.

A major contributor to the T - 45TS program's success is the open communications and the professional environment exhibited by all parties, both military and civilian. Both sides are very flexible and supportive within the confines of the contract; both sides aim to provide the Wing Commander with the aircraft needed to meet established pilot training goals and requirements. Everyone is seen to be working to keep communications open and to reduce stovepiping to make the program work.

An impediment to contractor performance and the adoption of best practices is the unique processes required by the NAMP. In addition, Navy directed unique processes require over 10 pages of applicable instructions and notices in the current and draft SOW.

D.   T - 34C AND T - 44A MAINTENANCE SUPPORT

To help jump - start PBSC as part of current efforts to reinvent acquisition, the OFPP developed a pilot program in which agencies volunteered to convert continuing contract requirements to PBSC as they came up for renewal. The pilot project began in October 1994 in conjunction with the enactment of the FASA.[20, p 2]

The Department of the Navy contracts out T - 43C and T - 44A maintenance support. This services contract was included in the pilot program. This program is similar to the T - 45TS requirements for CLS and includes numerous examples of successfully implemented commercial best practices.

The T - 34C is a single engine turboprop aircraft and the T - 44A is a dual engine turboprop. Both aircraft provide training for student Naval aviators, both aircraft are Federal Aviation Administration (FAA) certified, and are operated and maintained in accordance with FAA and original equipment manufacturer approved procedures. The broad range of required services includes flight servicing, aircraft launch and recover, component maintenance, engine repairs, modifications, airframe inspections and repairs, painting, material management, logistics, technical and general engineering support, support equipment maintenance, and life support equipment maintenance.[20, p 2]

Performance - based contracting states requirements in terms of efforts to be completed, but does not specify how they will be completed. One of the more difficult steps in transitioning to performance-based contracting is developing the work statement. A performance-based statement of work (SOW) could be as simple as: "maintain T - 34C and T - 44A aircraft safe for flight." While accurately stating the requirement, this description is far too simplistic and too high in risk because the contract covers 357 aircraft based at 12 military locations. The aircraft are flown daily by student pilots and are supported through the Navy logistics supply system.

To overcome these obstacles and retain a performance-based approach, separate tasks were defined, and offerors fixed prices for each task. For example, propeller overhaul is separately defined and priced. The minimum work statement would read "provide FAA - certified personnel and facilities to perform scheduled and preventative maintenance in accordance with manufactures publications, FAA directives, and U.S. Navy maintenance engineering directives over a range of aircraft quantities."

Performance-based contracting also required contractual requirements to be imposed in measurable terms. For example:

1. Aircraft are 80 percent mission capable.

2. The ground abort rate is less than 5 percent.

3. One hundred percent of flight schedules are met.

4. Turnaround times are limited for aircraft condition inspection/strip and paint.

Streamlining approaches were taken in preparing the solicitation and completing the requirement using best value award procedures. A draft RFP solicited industry inputs on alternatives to military specifications and standards. In response to industry's submissions, many military specifications and standards were deleted from the SOW. Some were deleted with no replacement; others were replaced with commercial standards, like the ISO 9000 series; mitigating language was applied to the remainder.

Under the contract, the contractor is held to a standard of performance and is empowered to use best commercial practices and management innovation. The contract does not specify how many plane captains, mechanics, or parachute riggers are required to be in a crew or on the job, but does set forth the minimum experience and training required for crew members. This can be changed to allow the contractor to hire qualified personnel based upon commercial standards and practices.

The contract provided both positive and negative incentives based on quantifiable standards. On the positive side, the material management function was turned over to the contractor. Material is obtained on a cost reimbursable basis, but the contractor earns a 15 percent positive incentive for cost avoidance. This "bonus" is calculated by comparing actual material costs with historical material costs adjusted by the appropriate Consumer Price Index. With regards to a negative incentive the contract includes price reductions for performance shortfalls. For example, the contract is priced at a ready for training rate of 75 percent. To the extent that this level of performance is not attained, the contract price will be reduced proportionately. An actual ready for training rate of 60 percent would result in a 20 percent reduction in contract price. However, initial performance

measurably exceeded the stated contractual requirements and there is little expectation that this negative incentive will be imposed.

Conversion to performance-base contracting generated an immediate $25 million savings. Additional savings are anticipated through the contracts positive and negative incentives. Critics might argue that performance-based contracting is more difficult and time consuming to prepare, compete and award. However, experience shows that the proposal, evaluation, and award process took 30 days less than was required for the previous nonperformance-based competition. The winning Navy/industry partnership has generated savings in dollars and time; thus far, performance has surpassed the contract minimums.[20, p 3]

E. UNITED AIRLINES (UAL) MAINTENANCE SERVICES

Background: United Air Lines is recognized as one of the world's top providers of aircraft maintenance services (CLS providers for USAF C - 17 and C - 32) as well as a leader in best practices. The Director of Maintenance Services and the Senior Representative of Maintenance Services for UAL were interviewed at their Maintenance Operations Center, San Francisco International Airport, San Francisco, CA.

UAL defines commercial best practice as an attitude not a checklist. The major themes are trust, communication, and the search for a better way. This mind set is evident throughout the organization. All areas of maintenance and management are open for review and improvement. If a changed process or procedure fails to improve performance, one can always go back; if it truly is better then you press forward. [21, 22]

All actions and requirements are analyzed to determine if they are truly "value added" vs. "no value added, but necessary for the process" vs. "no value added".[22] This is especially true of inspections. All inspection criteria are evaluated by looking at the actual process vs. the requirement for inspection. The critical inspection requirement to ensure safety of flight and mission capability are highly stressed. These factors have the same gravity as in the Navy with the added pressure of personal culpability and court litigation.

One noticeable characteristic of UAL was their reliance on ISO standards and their drive to certify the entire facility. Currently, only the Engine shop is ISO 9001 certified. The Airframes facility is scheduled to complete certification in 1999. The switch to ISO standards is seen as positive inducement to improve processes, provide checks and balances and institute the framework for continuous process improvement. Additionally, ISO processes standardize quality control functions and oversight for all of UAL's customers, external and internal. ISO 9001 certification is becoming a requirement to compete in the international market.

Contracting insight from UAL:

1.   Form IPTs; in today's rapidly changing and evolving environment to form an IPT is imperative. Open communications , trust, the sharing of ideas/knowledge and mutual understanding reduce costs and provide for a better product.

2.   State objectives clearly. Performance based metrics must be clearly understandable. State the objectives and let the contractor determine how to perform the job.

3. Need to use multi-year contracting. The major cost for a commercial contractor is in relocating people both in ramping up and in closing down a contract. Search, travel, set up , and change over costs are either absorbed on a yearly basis or absorbed once over the contract span. "One year contracts are like a date, we are looking for a relationship." [21]

4. Evolving process. The contract should encourage contractor innovation. This is the basis for best practices implementation. Allowing for contractor innovation does require trust and communications from all participants.[21, 22]

The final word on including commercial best practices was the need to eliminate government - specific requirements that essentially make the contractor recreate the government's organization and oversight structure. The whole idea is to be open to new ideas and methods. Emphasize what performance is wanted and stop delineating how it is to be done. "We've always done it this way" is no longer an excuse for inefficiency.[21]

F. UNITED STATES AIR FORCE (USAF) STREAMLINING INITIATIVE

The following illustrates an example of a DOD entitys efforts to streamline their acquisition effort and increase industry involvement i.e., best practice during pre - solicitation preparation.

1. Program Description

The USAF's Global Combat Support System (GCSS-AF) is modernizing its base level support systems into an integrated system capable of meeting its needs in both peace time and war. The goal is to maintain or improve current capabilities and reduce life-cycle support costs without degrading current operations.

2. **Specific Actions**

   a.   The government-industry team met face-to-face for a total of 82 hours during Request for Proposal (RFP) preparation. This compares to a Standard System Group (SSG) average of 40 hours for other solicitations over the past three years.

   b.   Industry was invited to assist the government in writing the solicitation evaluation criteria. The government presented the evaluation criteria on the first day of the session. The identified potential offerors worked side-by-side with each other as well as with the government, refining and prioritizing the criteria. The government presented final coordinated evaluation criteria the next day.

   c.   The solicitation minimized required government specifications, openly encouraged off-the-shelf software, commercial or government, and emphasized program objectives versus detailed design specifications.

   d.   The government provided industry with their closely guarded evaluation standards. SSG had to obtain approval from Secretary of the Air Force/(Acquisitions (SAF/AQ) for this highly unusual procedure.[22, p 1]

3. **How Streamlining Made a Difference**

Comparing the GCSS-AF source selection performance to past Standard

System Group (SSG) programs provides impressive evidence that SSG has embraced the

Air Force's acquisition reform initiatives. Not only did the GCSS - AF team streamline

their pre-award process, but they forged a government-industry team that increased

understanding of government intent and allowed industry to participate during the pre-solicitation phase. Communication with industry was enhanced by an electronic bulletin board and World Wide Web site containing all releasable acquisition information. This high level of cooperation has been enthusiastically embraced by industry as a model government-industry relationship.

	NEW	OLD
Hours with Industry Before RFP Release	82	31
Number of Draft RFPs	6+	3
Number of Mandatory CDRLs	3	47
Number of Required Military Specifications	0	7
RFP Pages	247	1304
Source Selection Evaluation Board Size	37	408

[23, p3]

A subtle but important change in the way the government communicated with industry on GCSS-AF is reflected in the terse Statement of Objectives (SOO) (one page) and Technical Requirements Documents (TRD) (seven pages) rather than the typically verbose Statement of Work (SOW). The SOO and TRD stated the government's high level objectives and bare minimum requirements in an effort to encourage industry innovation. Typically, the government states their requirements and how they want industry to develop or build the system; this inhibits innovation and the acceptance of

commercial technology and practices. Although new, this practice should eventually increase quality and reduce prices as industry brings commercial practices and solutions to the government sector.

The true measure of time and funding saved by these practices will be determined after contract award. The open communication should eliminate misunderstandings over requirements. The GCSS-AF program has not reached the point where savings in time and funding can be effectively determined. Savings of several months and cost savings in millions of dollars are predicted.

To summarize the governments bottom line: GCSS-AF efforts to increase communications with industry while reducing oversight and "how-to" requirements greatly increases the probability of obtaining the best contractor to modernize Air Force based-level support systems for the 21st century.[23, p2]

G.   CHAPTER SUMMARY

This chapter has covered diverse topics. Each of these topics help the reader understand the T - 45TS and the efforts within DOD and in the aircraft maintenance industry to improve practices to exploit innovative changes within the business world.

The section on the T - 45TS provides the background on the program and its current CLS arrangement. The highlights of this program and roadblocks to implementing best practices were also discussed. The outstanding working relationship and professionalism between the contractor and military throughout this program cannot be over emphasized. All personnel are working for improvements throughout the program.

The T - 34C and T - 44A maintenance contract illustrates a successful example of PBSC in a similar environment. The Navy saved over $25 million in this pilot program. This program demonstrates the possible benefits of PBSC and the inclusion of commercial quality standards.

The UAL and USAF contracting initiatives demonstrate how to interact with industry in the 21st century and capture the greatest benefits in CLS and contracting in general. The theme that is repeated throughout these sections is the demand and requirement for both full and open communication, and trust between all parties. Without these crucial elements, it is impossible to develop the close relationship required to exploit best commercial practices.

IV.   CONCLUSIONS AND RECOMMENDATIONS

A.   SUMMARY

This thesis has focused on the United States Navy (USN) experience in Contractor Logistics Support (CLS) within the T-45TS program. The ultimate goal was to identify improvements in contract methodology and language for this program in particular, and for future CLS implementations in general.

During the early and mid 1990's, numerous reports were published by both government and private sources which identified ways in which the Department of Defense could maximize its efficiency and enhance its effectiveness within the acquisition and life-cycle support arenas. These reports have received mixed reviews but have provided the base line for acquisition reform and its resulting streamlining within the department.

Outsourcing and privatization, cost as an independent variable and competition in contracting are just a few of the tools and methodologies that the civilian sector identified by which the Department of Defense could improve its acquisition and support practices. Key among these is the use of "commercial best practices."

Using commercial sector best practices is considered so key to acquisition reform and program success that DOD 5000.2R states that program managers are restricted from imposing government-unique requirements that significantly increase industry compliance cost.

Examples of practices designed to accomplish this direction include:

1. Open systems approach (incorporation of commercially supported practices, products, specifications, and standards);

2. Replacement of government-unique management and manufacturing systems with common, facility-wide systems;

3. Realistic cost estimates and cost objectives, adequate competition among viable offerors;

4. Best value evaluation and award criteria;

5. Use of past performance in source selection, results of software compatibility evaluations;

6. Government-industry partnerships;

7. The use of pilot programs to explore innovative practices.

Additionally, the use of best practices is to be addressed at each milestone review during program acquisition.

B. CONCLUSIONS

1. **Reductions in contractor and U.S. Navy costs can be accomplished within the T-45TS program through the application of acquisition streamlining approaches, commercial based support management oversight and business techniques vice strict 4790 compliance.** The implementation of ISO-9000 series quality control oversight and practices will ensure that a quality program and service is provided to the Navy. These savings will come about primarily through reductions in USN oversight. Key to these improvements is the shift in control i.e., letting the contractor do his job.

2.   **Competing this contract vice using a sole-source justification will be extremely hard and possibly costly in the long run.** Boeing owns the technical data rights to this program. DOD has not acquired the technical data rights for many of its weapons systems and their components as DOD officials believe that, at this point, buying the data would be too costly. Officials at the contracting organizations affirm that if the technical data is not bought as part of the initial acquisition package, the government has little leverage to get the data at an affordable price later on in the system's life cycle. Additionally, it is difficult to make an argument for a one time investment for technical data; private contractors may have little interest in competing for the work when it involves small volume, obsolete technology, irregular requirements, and/or unstable funding.

3.   **Commercialized support management will reduce administrative costs and paperwork.** On the maintenance side, the true savings will accrue by reducing NADEP/NATSF and other government oversight entities. Safety of flight should always be the primary concern regardless of any changes. There will always be a need for an adequate number of personnel to support an aggressive flight operations schedule/tempo of ops, including six day a week ops, four maintenance shifts and support of on-going detachments. Assuming no increases in staffing during FY99/00, the acceptance of additional aircraft, and an increased flight hour program/PTR, there will be a minimum number of personnel available to support this maintenance program.

4.   **There will be minimal savings on the CLS maintenance staffing - 311** total people to support the full "O" Level, "I" Level and the GSE organization does not

leave any room for additional cuts unless flight hours/PTR are reduced. The problem will be finding qualified personnel if the Navy increases its flight hours requirements and pilot training rates.

C.   RECOMMENDATIONS

This section discusses the recommendations developed from the research effort. The recommendations are broken down into Improving Contract Practices, Personnel Qualifications and Training.

1.   Improving Contract Practices

a.   State contract objective's clearly, with performance metrics developed to measure the objectives (i.e., "Provide Flyable Aircraft to Meet Flight Schedule"). Remember that the Navy is the customer; contractors will meet your needs.

b.   Eliminate OPNAVINST 4790.2 as a directive and continue its use for "guidance" as necessary. Keep specific programs such as FOD, oil analysis, hydraulic contamination, tool control, etc.

c.   NAVAIR should monitor contractors' efforts - not manage them.

d. Use IPTs to develop contract requirements. IPT participants should include Contractors, Navy Logisticians, Navy Contracting officers, DCMC , NATAMSAC and the user community.

e. Require ISO-9001/2 certification for contractors. This ensures a built-in quality process and analysis at no cost to the Government.

f. Use longer term contracts, 3 to 5 years, to be funded annually. Include flexible clauses for continuous improvement, inventory changes, and upgrades/updates, as currently used by the C-17,C-32 and FMTV programs.

2. **Personnel Qualifications**

a. Take advantage of personnel experience and stability by emphasizing greater use of Contractor/commercial qualifications. Let the contractor hire personnel based upon FAA certifications rather than both Military and FAA. There is a stable workforce with 16 + years average experience; the USN workforce typically has 3-7 years experience and a 30% annual turnover.

b. Do away with NAMP - based CDI requirements for non-safety of flight items.

c. Under commercialization and/or ISO 9001, reduce QA oversight function and consider moving QA personnel into the shops to augment maintenance personnel as well as to perform "safety of flight" final inspection requirements. QA personnel should also be able to perform non-safety of flight maintenance functions.

d. Explore a method to consolidate "O" level and "I" level into a "on-aircraft/off-aircraft" concept. It's best to maintain the power plants "I" level as well as GSE as it is. "I" level avionics/ electrical/ airframes and ordnance, for example, would be prime candidates to merge with the "O" level.

3. **Training**

a. Utilize Contractor certifications and qualifications vice in accordance with the NAMP 4790.2. The contractor should be able to determine requirements (ISO-9001).

b. Combine AME/PR ratings into a single billet.

c. Do away with every three year re-qualification on GSE. The personnel do not typically turn over within three years as implied by

this program. Ongoing monitoring is sufficient for oversight in this area.

    d.   ISO-9000 requires training and quality standards through continuous process improvement. Utilize this process rather than mandating Navy specific training and documentation.

D.   SUGGESTED FURTHER STUDIES

During the course of this research, the analysis identified numerous areas for further research. A key area for research is to compare ISO - 9000 procedures and policies for integrating quality improvements to current NAMP 4790 procedures. Other areas for research include:

    1.   A cost-benefit analysis of partnering with industry to provide further support and development of future aircraft needs.

    2.   Analyze total commercialization and/or privatization of the Navy's pilot training program, "power-by-the-hour."

ACRONYMS AND ABBREVIATIONS

ANSI	American National Standards Institute
ASQC	American Society for Quality Control
CBP	Commercial Best Practices
CLS	Contract Logistics Support
CM	Configuration Management
CNATRA	Chief of Naval Air Training
CNET	Chief of Naval Education and Training
CNO	Chief of Naval Operations
CORM	Commission On Roles and Missions
CTW	Commander Training Air Wing
D	Depot
DCA	Defense Commissary Agency
DCAA	Defense Contract Audit Agency
DFAS	Defense Finance and Accounting Service
DFAR	Defense Federal Acquisition Regulation
DISA	Defense Information Systems Agency
DLSC	Defense Logistics Services Center
DOD	Department of Defense
DON	Department of Navy
DSB	Defense Science Board

FAA	Federal Aviation Administration
FAR	Federal Acquisition Regulation
FY	Fiscal Year
GAO	Government Accounting Office
GCSS-AF	Global Combat Support System-Air Force
GFE	Government Furnished Equipment
GFM	Government Furnished Material
GFP	Government Furnished Property
GSE	Ground Support Equipment
I	Intermediate
ILS	Integrated Logistic Support
IMIP	Integrated Maintenance Improvement Program
IPT	Integrated Process Team
ISO	International Organization for Standardization
LSA	Logistic Support Analysis
NAMP	Naval Aviation Maintenance Program
NAS	Naval Air Station
NASK	Naval Air Station, Kingsville
NATAMSACT	Naval Air Training Management Support Activity
NAVAIR	Naval Air Systems Command
NIST	National Institute of Standards and Technology
O	Organizational

OFPP	Office of Federal Procurement Policy
OMB	Office of Management and Budget
PBSC	Performance Based Service Contracting
PWS	Performance Work Statement
QA	Quality Assurance
QA&R	Quality Assurance & Revalidation
QC	Quality Control
RFP	Request For Proposal
SDLM	Scheduled Depot Level Maintenance
SOO	Statement Of Objectives
SOW	Statement Of Work
SSG	Standard System Group
T - 45TS	T - 45 Training System
TAG	Technical Advisory Group
TRD	Technical Requirements Document
UAL	United Air Lines

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